

# A Comparative Study of Ease of Insertion of Laryngeal Mask Airway with Propofol and Thiopentone with Lignocaine Spray

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## ABSTRACT

**Introduction:** Study was conducted to determine the conditions for insertion of LMA following induction of anaesthesia with (Propofol, 2 mg/kg) and (Thiopentone, 5 mg/kg, preceded by 10%Lignocaine spray to the posterior oropharyngeal wall) by observing six different parameters (gagging, laryngospasm, body movements, coughing, ease of insertion, jaw relaxation) and assessing all six parameters together with Lund and Stovner gradingsystem. The hemodynamic parameters were recorded during induction of anaesthesia and following LMA insertion.

**Material and Methods:** Patients were allocated randomly into two groups, (40 patients per group), Group A- Propofol and Group B- Thiopentone, preceded with 10%Lignocaine spray.

**Results:** In Group A significant decrease in HR ( $p<0.05$ ), systolic BP ( $p<0.01$ ), diastolic BP ( $p<0.01$ ) and mean BP ( $p<0.01$ ) was observed as compared to Group B. The overall assessment for the ease of insertion of LMA was 100%in Group A and 97.5%in Group B which was statistically not significant ( $p=0.314$ ). No significant difference was observed in gagging ( $p=0.152$ ), laryngospasm ( $p=0.314$ ), body movements ( $p=0.221$ ), coughing ( $p=0.221$ ), jaw relaxation ( $p=0.314$ ) and the ease of insertion ( $p=0.314$ ).

**Discussion:** 10% Lignocaine spray suppresses upper airway reflexes in Thiopentone group and facilitates LMA insertion without any adverse response.

**Conclusion:** Thiopentone preceded with 10%Lignocaine spray to the posterior oropharynx (Group B) provides almost equal conditions for LMA insertion as compared to Propofol (Group A) with better hemodynamic stability.

**Keywords:** Laryngeal Mask Airway, Thiopentone, Propofol, Lignocaine Spray

into the trachea, providing the decreased risk of adverse cardiovascular events in patients with heart disease. The laryngeal mask airway (LMA) is mostly tolerated at lighter planes of anesthesia than an ETT.<sup>2</sup>

Laryngeal mask airway is inserted in to hypo pharynx to provide efficient perilaryngeal seal. This requires adequate suppression of oropharyngeal, laryngeal reflexes and adequate depth of anaesthesia, otherwise various complications may occur like coughing, body movements, laryngospasm, failure to insert laryngeal mask airway etc. Thiopentone does not suppress pharyngeal and laryngeal reflexes adequately. In our study we have used 10% Lignocaine spray along with Thiopentone to blunt these reflexes. Propofol suppresses these reflexes adequately following induction doses but affects hemodynamic of patients.

Our study was designed to assess adverse effects and hemodynamic changes occurring during laryngeal mask airway insertion.

## MATERIAL AND METHODS

After obtaining the institutional ethics committee approval and the informed consent regarding surgery, anaesthesia and participation in the study, the study was carried out in our department. It was a comparative, randomized, prospective study, which comprised of total 80 patients posted for short surgical procedures.

Patients of age group 16-45 years, ASA class 1 and 2, mallampatti grade I and II, undergoing short surgical procedures like fibro adenoma excision, incision and drainage of abscess, release of contractures etc. were included in our study. We excluded patients who refused to take part in study, who have potential anticipated difficult airway like mallampatti grade III and IV, less than two finger

## INTRODUCTION

Today's anesthesia practice was made possible by the introduction of the endotracheal tube (ETT), which leads long and complex surgical procedures possible without the major complications of airway obstruction, gastric contents aspiration, or asphyxia. For many years, orotracheal intubation or bag-and-mask ventilation were the only ways of airway management. In 1983 invention of the laryngeal mask airway (LMA) changed this, the first supraglottic airway device (SGA) which was similar to features of the facemask with those of the ETT<sup>1</sup>, giving easy placement and hands-free maintenance, along with a relatively secure airway.

SGA insertion is less stimulating to the sympathetic nervous system than direct laryngoscopy and inserting ETT

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mouth opening, thyromental distance less than 6cm etc. We also excluded patients with increased risk of aspiration like full stomach patients, pregnant patients, obese patients, and patients with any known airway or pharyngeal pathology.

Two groups were formed in our study Group A (Propofol group), Group B (Thiopentone with 10% Lignocaine spray group) each comprising of 40 patients. Randomization was done by computer generated numbers. After taking written informed consent from the patient, thorough pre anaesthetic checkup was done prior to the planned procedure. The patients were asked to undergo a preoperative fasting of 6 hours.

In the operation theater a peripheral venous line was placed in all patients, and pre-medication was done with inj. Glycopyrrolate 0.2mg, iv, inj. Ondansetron 4mg, iv, inj. Midazolam 0.02mg/kg, iv, 10min. prior to induction. Routine vital parameters were recorded using – three lead ECG, NIBP, pulse oximeter. Patients received inj. fentanyl in the dosage of 1mcg/kg. After pre oxygenation for 5 min. anaesthesia was induced with inj. Propofol 2mg/kg in patients of group A and in patients of group B 10% Lignocaine spray was done on both sides of posterior pharynx prior to pre oxygenation and then patient was pre oxygenated for 5 min. and anaesthesia was induced with inj. Thiopentone 5mg/kg. In both groups of patients inducing doses were titrated to loss of verbal contact, loss of eye lash reflex and relaxation of jaw. After confirming the possibility of bag and mask ventilation, the proper size Classic LMA according to weight of the patient was chosen.

Coughing, gagging, laryngospasm, and body movements were graded according to table-1.

Jaw relaxation and ease of LMA insertion were graded according to table-2

Adverse responses related laryngeal mask airway insertion were evaluated together according to Lund and Stovner grading system<sup>3</sup>

Excellent: Easy insertion and no adverse response from patient.

Good: Insertion causing mild adverse response.

Poor: moderate to severe or poor response to laryngeal mask airway insertion.

The hemodynamic parameters (heart rate, systolic, diastolic and mean blood pressure) were recorded before induction, after induction, 1 minute following laryngeal mask airway insertion, 5 minute following laryngeal mask airway insertion.

Maintenance was done with oxygen, nitrous oxide and intermittent bolus doses of respective anaesthetic drugs. After completion of the procedure the supraglottic device was removed in the deeper plane with the patient on spontaneous ventilation to avoid any kind of complication. The patients were observed with bag mask till they became fully awake and were following all verbal commands. Patients were shifted to recovery after vocalizing.

## RESULTS

Statistical analysis for age distribution and procedure time was done by unpaired t test, for gender distribution in both

0	Absent	
1	Mild	Adverse response lasting < 5 seconds
2	Moderate	Lasting > 5seconds, but subsiding within 20 seconds
3	Severe	Lasted > 20 seconds or extra boluses of drugs required

**Table-1:** Coughing, gagging, laryngospasm, and body movements were graded according to following table<sup>10</sup>

Excellent	No adverse response abolished within 5 seconds.
Satisfactory	Mild adverse response to laryngeal mask airway insertion, but not resulting in failure of insertion.
Poor	Moderate/ severe adverse response or > 2 attempts needed to insert laryngeal mask airway.

**Table-2:** Jaw relaxation and ease of LMA insertion were graded according to following table<sup>11</sup>

	Group A (Propofol group)	Group B (Thiopentone group)
Number of patients (male/ female)	40 (15/25)	40 (19/21)
Mean age (in years) (P value- 0.935)	30.38	30.20
Mean weight (in kg)	53.2	56.25
Mean procedure time (in minutes) (P value- 0.221)	37.23	40.43

**Table-3:** General observation

	Group A		Group B	
	Mean	Std. deviation	Mean	Std. deviation
Before induction	95.4000	11.24962	90.7750	13.503
After induction	91.55	10.500	97.03	12.497
1 min. after LMA insertion	92.1500	10.62061	98.6000	12.241
5 min. after LMA insertion	90.48	10.595	98.15	10.897

**Table-4:** Heart rate (mean)

	Group A		Group B	
	Mean	Std. deviation	Mean	Std. deviation
Before induction	127.63	12.287	127.35	10.939
After induction	102.50	12.647	118.63	10.760
1 min. after LMA insertion	101.63	10.275	114.70	10.206
5 min. after LMA insertion	105.15	9.893	115.48	11.052

Table-5: Systolic BP

	Group A		Group B	
	Mean	Std. deviation	Mean	Std. deviation
Before induction	79.50	12.545	80.50	7.776
After induction	63.60	11.586	74.60	7.537
1 min. after LMA insertion	62.10	10.081	70.45	7.562
5 min. after LMA insertion	63.88	8.919	71.23	8.447

Table-6: Diastolic BP

	Group A		Group B	
	Mean	Std. deviation	Mean	Std. deviation
Before induction	94.13	11.811	95.63	8.164
After induction	74.73	12.368	89.48	7.822
1 min. after LMA insertion	75.35	9.139	84.45	8.187
5 min. after LMA insertion	76.48	11.017	85.05	8.575

Table-7: Mean BP

	Grading	Group A	Group B
Gagging (P value- 0.152)	0	40	38
	1	0	2
	2	0	0
	3	0	0
Laryngospasm (P value- 0.314)	0	40	39
	1	0	0
	2	0	0
	3	0	1
Body movements (P value- 0.221)	0	39	35
	1	1	4
	2	0	0
	3	0	1
Coughing (P value- 0.069)	0	40	35
	1	0	4
	2	0	0
	3	0	1

Table-8: Adverse reaction to LMA insertion

	Grading	Group A	Group B
Jaw relaxation (P value- 0.314)	Excellent	40	39
	Satisfactory	0	1
	Poor	0	0
The ease of insertion (P value- 0.314)	Excellent	40	39
	Satisfactory	0	1
	Poor	0	0

Table-9: Jaw relaxation and the ease of insertion grading

	Grading	Group A	Group B
Lund and S Table 9. Jaw relaxation and the ease of insertion grading toverner grades (P value- 0.314)	Excellent	40 (100%)	39 (97.5%)
	Good	0	0
	Poor	0	1 (2.5%)

Table-10: Lund and Stovner grading

groups was done by Pearson chi square test, for hemodynamic parameters was done by paired t test. Statistical analysis for parameters related to adverse responses to LMA insertion (gagging, laryngospasm, body movements, coughing, and jaw relaxation, the ease of insertion, and Lund and Stovner grading) was done by Pearson chi square test. A p value of <0.05 was accepted as being statistically significant.

#### General observation

Observations regarding number of patients mean age, mean weight, mean procedure time were shown in table 3.

These observations were comparable in both groups and differences were statistically not significant ( $p>0.05$ ).

#### Hemodynamic parameters

Table 4, 5, 6, 7 shows observations regarding hemodynamic parameters variation.

Heart rate (table 4) in Group A decreased significantly ( $p<0.05$ ), and in Group B significant ( $p<0.05$ ) increase in heart rate was observed.

Decrease in Systolic (table 5) and Diastolic BP (table 6) was observed in both groups, but it was significant ( $p<0.05$ ) in Group A.

Significant ( $p=0.000$ ) decrease in mean BP (table 7) was observed in Group A only.

#### Adverse reaction to LMA insertion

Table 8 shows observations of adverse reaction (gagging, laryngospasm, body movements, coughing) to LMA insertion and table 9 shows observations of jaw relaxation the ease of insertion grading.

The difference in both groups regarding adverse reactions following LMA insertion were statistically not significant ( $p>0.05$ ).

### Lund and Stovner grading

Table 10 shows Lund and Stovner grading observations. The difference in Lund and Stovner grading was statistically not significant ( $p > 0.05$ ).

### DISCUSSION

Our study results regarding variability in hemodynamic parameters go in hand with the study done by Vandana Talwar et al,<sup>4</sup> where they observed significantly greater decrease in heart rate and blood pressures in Propofol group as compared to the Thiopentone group. Propofol causes vasodilatation and decrease in sympathetic activity resulting in marked decrease in blood pressure. Propofol also suppresses baroreceptor reflex and blocks the response of tachycardia to hypotension.<sup>5</sup> Thiopentone leads to peripheral vasodilatation and venous pooling of blood causing hypotension but this response is accompanied by baroreceptor activation resulting in sympathetic system stimulation and increase in heart rate.<sup>6</sup> Patrick Scanlon,<sup>7</sup> Vandana Talwar,<sup>4</sup> Parhaizgar Khan, Yasmeen Afridi<sup>8</sup> they all concluded in their study that Propofol is better agent for LMA insertion than Thiopentone. The difference between our observations regarding adverse reaction to LMA insertion with the above quoted studies might be due to the fact that 10% Lignocaine spray was used in our study which was lacking in the above studies.

Thiopentone does not suppress oropharyngeal, laryngeal reflexes and Propofol suppresses these reflexes in their anaesthetic induction doses. Since 10% Lignocaine spray was used in our study, these reflexes did not manifest in the Thiopentone group. The same observations were reflected in study conducted by Keerthi Kumar S,<sup>9</sup> they concluded that Thiopentone with local anaesthetic spray to larynx for insertion of LMA produced the same conditions as that of Propofol use.

### CONCLUSION

We conclude that Thiopentone preceded with 10% Lignocaine spray to the posterior oropharynx (Group B) provides almost equal conditions for LMA insertion as compared to Propofol (Group A) with better hemodynamic stability.

### Registration

Our study got registered with Clinical Trial Registry of India on 06/09/2016 with CTRI No. being CTRI/2016/09/007239.

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